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      Sommergruber, Wolfgang
      Abseher, Roger

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Val Ile Glu Ile Gln Lys Asn Ile Asp Cys Met Ser Gly Pro Cys Pro
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Glu Leu Gln Phe Ser Ile Pro Arg Leu Arg Gln Ile Gly Pro Gly Glu
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Ser Cys Pro Asp Gly Val Thr His Ser Ile Ser Gly Arg Ile Asp Ala
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cac ccc aga aat gtc tcc ggc ttc agc att gca aac cgc tca tct ata   667
His Pro Arg Asn Val Ser Gly Phe Ser Ile Ala Asn Arg Ser Ser Ile
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caa ggc tgt gac caa gat gcc caa agt cca ggg atc ctc cgg ctg cag    1003
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gtg gtt gac ttg agt aat gag cga gcc atg tca ctc acc atc gag cca    1099
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Asn Val Glu Lys Thr Ile Ser Cys Thr Asp His Arg Tyr Cys Gln Arg
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Lys Ser Tyr Ser Leu Gln Val Pro Ser Asp Ile Leu His Leu Pro Val
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Glu Leu His Asp Phe Ser Trp Lys Leu Leu Val Pro Lys Asp Arg Leu
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agc cag gac ctg tac ttc ggc tcc ttc tgc ccg gga ggc tct atc aag    1531
Ser Gln Asp Leu Tyr Phe Gly Ser Phe Cys Pro Gly Gly Ser Ile Lys
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cag atc cag gtg aag cag aac atc tcg gtg acc ctt cgc acc ttt gcc    1579
Gln Ile Gln Val Lys Gln Asn Ile Ser Val Thr Leu Arg Thr Phe Ala
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ccc agc ttc caa caa gag gcc tcc agg cag ggt ctg acg gtg tcc ttt    1627
Pro Ser Phe Gln Gln Glu Ala Ser Arg Gln Gly Leu Thr Val Ser Phe
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ata cct tat ttc aaa gag gaa ggc gtt ttc acg gtg acc cct gac aca    1675
Ile Pro Tyr Phe Lys Glu Glu Gly Val Phe Thr Val Thr Pro Asp Thr
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aaa agc aag gtc tac ctg agg acc ccc aac tgg gac cgg ggc ctg cca    1723
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gcc tgc ctg act ttc ttt aag gag cgg agc ggc gtg gtc tgc cag aca    1819
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Ile Pro Thr Met Gly Met
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Thr Ser Leu Leu Pro Thr Leu Asn Arg Thr Phe Ile Trp Asp Val Lys
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Ala His Lys Ser Ile Gly Leu Glu Leu Gln Phe Ser Ile Pro Arg Leu
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Arg Gln Ile Gly Pro Gly Glu Ser Cys Pro Asp Gly Val Thr His Ser
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Ile Ser Gly Arg Ile Asp Ala Thr Val Val Arg Ile Gly Thr Phe Cys
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Ser Asn Gly Thr Val Ser Arg Ile Lys Met Gln Glu Gly Val Lys Met
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Ala Leu His Leu Pro Trp Phe His Pro Arg Asn Val Ser Gly Phe Ser
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Gln Gly Leu Thr Val Ser Phe Ile Pro Tyr Phe Lys Glu Glu Gly Val
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Phe Thr Val Thr Pro Asp Thr Lys Ser Lys Val Tyr Leu Arg Thr Pro
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Ser Ile Lys Ser Gly Glu Arg Ile Val Phe Thr Phe Ser Cys Gln Ser
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      atc ggt ccg ggt gag agc tgc cca gac gga gtc act cac tcc atc agc    774
      Ile Gly Pro Gly Glu Ser Cys Pro Asp Gly Val Thr His Ser Ile Ser
              150                      155                      160

      ggc cga atc gat gcc acc gtg gtc agg atc gga acc ttc tgc agc aat    822
      Gly Arg Ile Asp Ala Thr Val Val Arg Ile Gly Thr Phe Cys Ser Asn
      165                      170                      175                180

      ggc act gtg tcc cgg atc aag atg caa gaa gga gtg aaa atg gcc tta    870
      Gly Thr Val Ser Arg Ile Lys Met Gln Glu Gly Val Lys Met Ala Leu
                      185                      190                      195

      cac ctc cca tgg ttc cac ccc aga aat gtc tcc ggc ttc agc att gca    918
      His Leu Pro Trp Phe His Pro Arg Asn Val Ser Gly Phe Ser Ile Ala
                      200                      205                      210

      aac cgc tca tct ata aaa cgt ctg tgc atc atc gag tct gtg ttt gag    966
      Asn Arg Ser Ser Ile Lys Arg Leu Cys Ile Ile Glu Ser Val Phe Glu
                  215                      220                      225

      ggt gaa ggc tca gca acc ctg atg tct gcc aac tac cca gaa ggc ttc    1014
      Gly Glu Gly Ser Ala Thr Leu Met Ser Ala Asn Tyr Pro Glu Gly Phe
          230                      235                      240

      cct gag gat gag ctc atg acg tgg cag ttt gtc gtt cct gca cac ctg    1062
      Pro Glu Asp Glu Leu Met Thr Trp Gln Phe Val Val Pro Ala His Leu
      245                      250                          255                260

      cgg gcc agc gtc tcc ttc ctc aac ttc aac ctc tcc aac tgt gag agg    1110
      Arg Ala Ser Val Ser Phe Leu Asn Phe Asn Leu Ser Asn Cys Glu Arg
                      265                      270                      275

      aag gag gag cgg gtt gaa tac tac atc ccg ggc tcc acc acc aac ccc    1158
      Lys Glu Glu Arg Val Glu Tyr Tyr Ile Pro Gly Ser Thr Thr Asn Pro
                      280                      285                      290

      gag gtg ttc aag ctg gag gac aag cag cct ggg aac atg gcg ggg aac    1206
      Glu Val Phe Lys Leu Glu Asp Lys Gln Pro Gly Asn Met Ala Gly Asn
                      295                      300                      305

      ttc aac ctc tct ctg caa ggc tgt gac caa gat gcc caa agt cca ggg    1254
      Phe Asn Leu Ser Leu Gln Gly Cys Asp Gln Asp Ala Gln Ser Pro Gly
              310                      315                      320

      atc ctc cgg ctg cag ttc caa gtt ttg gtc caa cat cca caa aat gaa    1302
      Ile Leu Arg Leu Gln Phe Gln Val Leu Val Gln His Pro Gln Asn Glu
      325                      330                      335                340
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agc aat aaa atc tac gtg gtt gac ttg agt aat gag cga gcc atg tca      1350
Ser Asn Lys Ile Tyr Val Val Asp Leu Ser Asn Glu Arg Ala Met Ser
                345                 350                 355


ctc acc atc gag cca cgg ccc gtc aaa cag agc cgc aag ttt gtc cct      1398
Leu Thr Ile Glu Pro Arg Pro Val Lys Gln Ser Arg Lys Phe Val Pro
                360                 365                 370

ggc tgt ttc gtg tgt cta gaa tct cgg acc tgc agt agc aac ctc acc      1446
Gly Cys Phe Val Cys Leu Glu Ser Arg Thr Cys Ser Ser Asn Leu Thr
            375                 380                 385

ctg aca tct ggc tcc aaa cac aaa atc tcc ttc ctt tgt gat gat ctg      1494
Leu Thr Ser Gly Ser Lys His Lys Ile Ser Phe Leu Cys Asp Asp Leu
            390                 395                 400

aca cgt ctg tgg atg aat gtg gaa aaa acc ata agc tgc aca gac cac      1542
Thr Arg Leu Trp Met Asn Val Glu Lys Thr Ile Ser Cys Thr Asp His
405                 410                 415                 420

cgg tac tgc caa agg aaa tcc tac tca ctc cag gtg ccc agt gac atc      1590
Arg Tyr Cys Gln Arg Lys Ser Tyr Ser Leu Gln Val Pro Ser Asp Ile
                425                 430                 435

ctc cac ctg cct gtg gag ctg cat gac ttc tcc tgg aag ctg ctg gtg      1638
Leu His Leu Pro Val Glu Leu His Asp Phe Ser Trp Lys Leu Leu Val
            440                 445                 450

ccc aag gac agg ctc agc ctg gtg ctg gtg cca gcc cag aag ctg cag      1686
Pro Lys Asp Arg Leu Ser Leu Val Leu Val Pro Ala Gln Lys Leu Gln
            455                 460                 465

cag cat aca cac gag aag ccc tgc aac acc agc ttc agc tac ctc gtg      1734
Gln His Thr His Glu Lys Pro Cys Asn Thr Ser Phe Ser Tyr Leu Val
            470                 475                 480

gcc agt gcc ata ccc agc cag gac ctg tac ttc ggc tcc ttc tgc ccg      1782
Ala Ser Ala Ile Pro Ser Gln Asp Leu Tyr Phe Gly Ser Phe Cys Pro
485                 490                 495                 500

gga ggc tct atc aag cag atc cag gtg aag cag aac atc tcg gtg acc      1830
Gly Gly Ser Ile Lys Gln Ile Gln Val Lys Gln Asn Ile Ser Val Thr
                505                 510                 515

ctt cgc acc ttt gcc ccc agc ttc caa caa gag gcc tcc agg cag ggt      1878
Leu Arg Thr Phe Ala Pro Ser Phe Gln Gln Glu Ala Ser Arg Gln Gly
            520                 525                 530

ctg acg gtg tcc ttt ata cct tat ttc aaa gag gaa ggc gtt ttc acg      1926
Leu Thr Val Ser Phe Ile Pro Tyr Phe Lys Glu Glu Gly Val Phe Thr
            535                 540                 545
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gtg acc cct gac aca aaa agc aag gtc tac ctg agg acc ccc aac tgg    1974
Val Thr Pro Asp Thr Lys Ser Lys Val Tyr Leu Arg Thr Pro Asn Trp
    550             555             560

gac cgg ggc ctg cca tcc ctc acc tct gtg tcc tgg aac atc agc gtg    2022
Asp Arg Gly Leu Pro Ser Leu Thr Ser Val Ser Trp Asn Ile Ser Val
565             570             575             580


ccc aga gac cag gtg gcc tgc ctg act ttc ttt aag gag cgg agc ggc    2070
Pro Arg Asp Gln Val Ala Cys Leu Thr Phe Phe Lys Glu Arg Ser Gly
            585             590             595

gtg gtc tgc cag aca ggg cgc gca ttc atg atc atc cag gag cag cgg    2118
Val Val Cys Gln Thr Gly Arg Ala Phe Met Ile Ile Gln Glu Gln Arg
            600             605             610

acc cgg gct gag gag atc ttc agc ctg gac gag gat gtg ctc ccc aag    2166
Thr Arg Ala Glu Glu Ile Phe Ser Leu Asp Glu Asp Val Leu Pro Lys
            615             620             625

cca agc ttc cac cat cac agc ttc tgg gtc aac atc tct aac tgc agc    2214
Pro Ser Phe His His His Ser Phe Trp Val Asn Ile Ser Asn Cys Ser
    630             635             640

ccc acg agc ggc aag cag cta gac ctg ctc ttc tcg gtg aca ctt acc    2262
Pro Thr Ser Gly Lys Gln Leu Asp Leu Leu Phe Ser Val Thr Leu Thr
645             650             655             660

cca agg act gtg gac ttg act gtc atc ctc atc gca gcg gtg gga ggt    2310
Pro Arg Thr Val Asp Leu Thr Val Ile Leu Ile Ala Ala Val Gly Gly
            665             670             675

gga gtc tta ctg ctg tct gcc ctc ggg ctc atc att tgc tgt gtg aaa    2358
Gly Val Leu Leu Leu Ser Ala Leu Gly Leu Ile Ile Cys Cys Val Lys
            680             685             690

aag aag aaa aag aag aca aac aag ggc ccc gct gtg ggt atc tac aat    2406
Lys Lys Lys Lys Lys Thr Asn Lys Gly Pro Ala Val Gly Ile Tyr Asn
            695             700             705

ggc aac atc aat act gag atg ccg agg cag cca aaa aag ttt cag aaa    2454
Gly Asn Ile Asn Thr Glu Met Pro Arg Gln Pro Lys Lys Phe Gln Lys
    710             715             720

ggg cga aag gac aat gac tcc cat gtg tat gca gtc atc gag gac acc    2502
Gly Arg Lys Asp Asn Asp Ser His Val Tyr Ala Val Ile Glu Asp Thr
725             730             735             740

atg gta tat ggg cat ctg cta cag gat tcc agc ggc tcc ttc ctg cag    2550
Met Val Tyr Gly His Leu Leu Gln Asp Ser Ser Gly Ser Phe Leu Gln
            745             750             755
```

```
cca gag gtg gac acc tac cgg ccg ttc cag ggc acc atg ggg gtc tgt     2598
Pro Glu Val Asp Thr Tyr Arg Pro Phe Gln Gly Thr Met Gly Val Cys
            760                 765             770

cct ccc tcc cca ccc acc ata tgc tcc agg gcc cca act gca aag ttg     2646
Pro Pro Ser Pro Pro Thr Ile Cys Ser Arg Ala Pro Thr Ala Lys Leu
            775                 780             785

gcc act gag gag cca cct cct cgc tcc cct cct gag tct gag agt gaa     2694
Ala Thr Glu Glu Pro Pro Pro Arg Ser Pro Pro Glu Ser Glu Ser Glu
            790             795             800


ccg tac acc ttc tcc cat ccc aac aat ggg gat gta agc agc aag gac     2742
Pro Tyr Thr Phe Ser His Pro Asn Asn Gly Asp Val Ser Ser Lys Asp
805                 810             815                 820

aca gac att ccc tta ctg aac act cag gag ccc atg gag cca gca gaa     2790
Thr Asp Ile Pro Leu Leu Asn Thr Gln Glu Pro Met Glu Pro Ala Glu
                825                 830                 835

taa cttgatccat tccagacgct ttgctgagtt tcataaagca gggcactgag         2843
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acacccgtcc gtgttcctaa ccagaaatcc taaagaagag gaattataca gaaggaacag 2903

caggaggttt tcctggacac cgccaacttc acattgctca gtggactcat tctaagggca 2963

agacattgaa aatgatgaat tccaatctgg atacagtcat gacagctcat gtgctcctca 3023

acttaggctg tgcggttagc cagcctgtaa tgagaggaga gaggcctgag tcacctagca 3083

tagggttgca gcaagccctg gattcagagt gttaaacaga ggcttgccct cttcaggaca 3143

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caaatgtata accacctagc tcttttcacc tgacttagta ataactcata ctaactggtt 3323

tggatgcctg ggttgtgact tctactgacc gctagataaa cgtgtgcctg tcccccaggt 3383

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Leu Leu Gly Ala Ala Arg Leu Pro Arg Gly Ala Glu Ala Phe Glu Ile
            20   25   30

Ala Leu Pro Arg Glu Ser Asn Ile Thr Val Leu Ile Lys Leu Gly Thr
        35   40   45

Pro Thr Leu Leu Ala Lys Pro Cys Tyr Ile Val Ile Ser Lys Arg His
    50   55   60

Ile Thr Met Leu Ser Ile Lys Ser Gly Glu Arg Ile Val Phe Thr Phe
65   70   75   80

Ser Cys Gln Ser Pro Glu Asn His Phe Val Ile Glu Ile Gln Lys Asn
                85   90   95

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Ile Asp Cys Met Ser Gly Pro Cys Pro Phe Gly Glu Val Gln Leu Gln
        100             105                 110

Pro Ser Thr Ser Leu Leu Pro Thr Leu Asn Arg Thr Phe Ile Trp Asp
        115             120                 125

Val Lys Ala His Lys Ser Ile Gly Leu Glu Leu Gln Phe Ser Ile Pro
    130             135                 140

Arg Leu Arg Gln Ile Gly Pro Gly Glu Ser Cys Pro Asp Gly Val Thr
145             150                 155                 160

His Ser Ile Ser Gly Arg Ile Asp Ala Thr Val Val Arg Ile Gly Thr
                165             170                 175

Phe Cys Ser Asn Gly Thr Val Ser Arg Ile Lys Met Gln Glu Gly Val
        180             185                 190

Lys Met Ala Leu His Leu Pro Trp Phe His Pro Arg Asn Val Ser Gly
        195             200             205

Phe Ser Ile Ala Asn Arg Ser Ser Ile Lys Arg Leu Cys Ile Ile Glu
    210             215                 220

Ser Val Phe Glu Gly Glu Gly Ser Ala Thr Leu Met Ser Ala Asn Tyr
225             230                 235                 240

Pro Glu Gly Phe Pro Glu Asp Glu Leu Met Thr Trp Gln Phe Val Val
            245             250                 255

Pro Ala His Leu Arg Ala Ser Val Ser Phe Leu Asn Phe Asn Leu Ser
        260             265                 270

Asn Cys Glu Arg Lys Glu Glu Arg Val Glu Tyr Tyr Ile Pro Gly Ser
        275             280             285

Thr Thr Asn Pro Glu Val Phe Lys Leu Glu Asp Lys Gln Pro Gly Asn
    290             295             300

Met Ala Gly Asn Phe Asn Leu Ser Leu Gln Gly Cys Asp Gln Asp Ala
305             310             315                 320

Gln Ser Pro Gly Ile Leu Arg Leu Gln Phe Gln Val Leu Val Gln His
            325             330                 335

Pro Gln Asn Glu Ser Asn Lys Ile Tyr Val Val Asp Leu Ser Asn Glu
            340             345                 350

Arg Ala Met Ser Leu Thr Ile Glu Pro Arg Pro Val Lys Gln Ser Arg
        355             360             365

Lys Phe Val Pro Gly Cys Phe Val Cys Leu Glu Ser Arg Thr Cys Ser
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                370                 375                 380
     - -- ---- -- Ser  Asn  Leu  Thr  Leu  Thr  Ser  Gly  Ser  Lys  His  Lys  Ile  Ser  Phe  Leu
                385                 390                 395                 400

                Cys  Asp  Asp  Leu  Thr  Arg  Leu  Trp  Met  Asn  Val  Glu  Lys  Thr  Ile  Ser
                               405                 410                 415

                Cys  Thr  Asp  His  Arg  Tyr  Cys  Gln  Arg  Lys  Ser  Tyr  Ser  Leu  Gln  Val
                               420                 425                 430

                Pro  Ser  Asp  Ile  Leu  His  Leu  Pro  Val  Glu  Leu  His  Asp  Phe  Ser  Trp
                               435                 440                 445

                Lys  Leu  Leu  Val  Pro  Lys  Asp  Arg  Leu  Ser  Leu  Val  Leu  Val  Pro  Ala
                     450                 455                 460

                Gln  Lys  Leu  Gln  Gln  His  Thr  His  Glu  Lys  Pro  Cys  Asn  Thr  Ser  Phe
                465                 470                 475                 480

                Ser  Tyr  Leu  Val  Ala  Ser  Ala  Ile  Pro  Ser  Gln  Asp  Leu  Tyr  Phe  Gly
                               485                 490                 495

                Ser  Phe  Cys  Pro  Gly  Gly  Ser  Ile  Lys  Gln  Ile  Gln  Val  Lys  Gln  Asn
                               500                 505                 510

                Ile  Ser  Val  Thr  Leu  Arg  Thr  Phe  Ala  Pro  Ser  Phe  Gln  Gln  Glu  Ala
                     515                 520                 525

                Ser  Arg  Gln  Gly  Leu  Thr  Val  Ser  Phe  Ile  Pro  Tyr  Phe  Lys  Glu  Glu
                     530                 535                 540

                Gly  Val  Phe  Thr  Val  Thr  Pro  Asp  Thr  Lys  Ser  Lys  Val  Tyr  Leu  Arg
                545                 550                 555                 560

                Thr  Pro  Asn  Trp  Asp  Arg  Gly  Leu  Pro  Ser  Leu  Thr  Ser  Val  Ser  Trp
                               565                 570                 575

                Asn  Ile  Ser  Val  Pro  Arg  Asp  Gln  Val  Ala  Cys  Leu  Thr  Phe  Phe  Lys
                               580                 585                 590

                Glu  Arg  Ser  Gly  Val  Val  Cys  Gln  Thr  Gly  Arg  Ala  Phe  Met  Ile  Ile
                     595                 600                 605

                Gln  Glu  Gln  Arg  Thr  Arg  Ala  Glu  Glu  Ile  Phe  Ser  Leu  Asp  Glu  Asp
                     610                 615                 620

                Val  Leu  Pro  Lys  Pro  Ser  Phe  His  His  His  Ser  Phe  Trp  Val  Asn  Ile
                625                 630                 635                 640

                Ser  Asn  Cys  Ser  Pro  Thr  Ser  Gly  Lys  Gln  Leu  Asp  Leu  Leu  Phe  Ser
                               645                 650                 655
```

```
Val Thr Leu Thr Pro Arg Thr Val Asp Leu Thr Val Ile Leu Ile Ala
            660                 665         670

Ala Val Gly Gly Gly Val Leu Leu Leu Ser Ala Leu Gly Leu Ile Ile
            675             680             685

Cys Cys Val Lys Lys Lys Lys Lys Thr Asn Lys Gly Pro Ala Val
    690             695             700

Gly Ile Tyr Asn Gly Asn Ile Asn Thr Glu Met Pro Arg Gln Pro Lys
705             710             715                 720

Lys Phe Gln Lys Gly Arg Lys Asp Asn Asp Ser His Val Tyr Ala Val
            725             730             735

Ile Glu Asp Thr Met Val Tyr Gly His Leu Leu Gln Asp Ser Ser Gly
            740             745                 750

Ser Phe Leu Gln Pro Glu Val Asp Thr Tyr Arg Pro Phe Gln Gly Thr
            755             760             765

Met Gly Val Cys Pro Pro Ser Pro Pro Thr Ile Cys Ser Arg Ala Pro
    770             775             780

Thr Ala Lys Leu Ala Thr Glu Glu Pro Pro Pro Arg Ser Pro Pro Glu
785             790             795                 800

Ser Glu Ser Glu Pro Tyr Thr Phe Ser His Pro Asn Asn Gly Asp Val
            805             810             815

Ser Ser Lys Asp Thr Asp Ile Pro Leu Leu Asn Thr Gln Glu Pro Met
            820             825             830

Glu Pro Ala Glu
        835
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<210> 5
<211> 23
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<400> 5
accgcctcaa cttgttcaca tgg                                    23


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<212> DNA
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<400> 12
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<400> 19
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<210> 20
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<212> DNA
<213> Kunstliche Sequenz

<220>
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<213> Kunstliche Sequenz

<220>
<223> Beschreibung der kunstlichen Sequenz: Primer

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<400> 22
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<400> 27
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<210> 28
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<223> Beschreibung der kunstlichen Sequenz: Primer

<400> 28
ttgaattcac tgtgtggagc c                                      21


<210> 29
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<212> DNA
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<220>
<223> Beschreibung der kunstlichen Sequenz: Primer

<400> 29
tgcaggcaac agtgatgtc                                         19


<210> 30
<211> 24
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<400> 30
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<210> 31
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<212> DNA
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<220>
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<210> 32
<211> 22
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<220>
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<400> 32
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<210> 33
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<400> 33
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<210> 34
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<212> DNA
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<220>
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<400> 34
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<210> 35
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<212> DNA
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<400> 35
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<210> 36
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<400> 36
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<210> 37
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<212> DNA
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<220>
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<400> 37
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<223> cap signal; Transkriptionsstart

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<210> 39
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<400> 39
agaacccccta gcagtgcgat agagac   26

<210> 40
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<220>
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<400> 40
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